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EXAMINER	
BALASUBRAMANIAN, VENKATARAMAN	
ART UNIT	PAPER NUMBER
1624	

NOTIFICATION DATE	DELIVERY MODE
11/25/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/552,304	PENG ET AL.	
	Examiner	Art Unit	
	/Venkataraman Balasubramanian/	1624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 August 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12,14-27 and 34-39* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12,14-22,26,27,34 and 36-39* is/are rejected.

7)☒ Claim(s) *23-25* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Applicants' response, which included cancellation of claims 13, 28-33 and amendment to claims 1, 18, 21, 23-25 and 34, filed on 08/27/2009, is made of record. Claims 1-12, 14-27 and 34-39 are now pending. In view of applicants' response, the 112 second paragraph rejection made in the previous office action has been obviated. However, the following 112 first paragraph rejection made in the previous office action is applied to currently pending method of use claims 34 and 36-39.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 2-12 and 14-22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

1. Claims 2, 3 and the dependent claims 4-12 and 14-22 are indefinite as claim 2 and 3 recites L choices without reciting the definition of the variables of L choices. There is no indication as what the definition of these variables are and hence it is not possible know the structural make-up of the compounds embraced in these claims.

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 34 and 36-39 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for treating Parkinson's disease does not

reasonably provide enablement for treatment all or any disease central nervous system diseases, as embraced in the claim language. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims.

The instant claim 34 and its dependent claims 35-39 are drawn to a method of treating a disorder or disease selected from Parkinson's disease, progressive supranuclear palsy, multiple system atrophy, Alzheimer's disease, depression, AIDS encephalopathy, multiple sclerosis, amyotrophic lateral sclerosis, migraine, attention deficit disorder, narcolepsy, sleep apnea that results in excessive daytime sleepiness, Huntington's disease, cerebral ischemia, brain trauma, hepatic fibrosis, cirrhosis, and fatty liver.

Instant claims, as recited, are reach through claims. A reach through claim is a claim drawn to a mechanistic, receptor binding or enzymatic functionality in general format and thereby reach through a scope of invention for which they lack adequate written description and enabling disclosure in the specification.

In the instant case, based on the inhibition or modulation of adenosine-A_{2a} receptors by the instant compounds, instant claims reaches through inhibiting and treating any or all diseases and disorders stated above in general and thereby they lack adequate written description and enabling disclosure in the specification.

More specifically, in the instant case, based on the mode of action of instant compounds as inhibitor or modulator of adenosine-A_{2a} receptors, based on limited assay, it is claimed that treating all diseases or disorders stated above, which there is

no enabling disclosure. The scope of the claims include both treating any or all diseases/disorders stated above due to said mode of action for which there is no enabling disclosure.

Reading from specification these include neurodegenerative diseases such as Parkinson's disease and Parkinson's-like syndromes such as progressive supranuclear palsy and multiple system atrophy, senile dementia such as Alzheimer's disease, depression, AIDS encephalopathy, multiple sclerosis, amylotrophic lateral sclerosis, migraine, attention deficit disorder, narcolepsy), sleep apnea or other disorders that cause excessive daytime sleepiness, Huntington's disease, cerebral ischemia, brain trauma, hepatic fibrosis, cirrhosis, and fatty liver.

The scope of the claims is not adequately enabled solely based on the activity of the compounds provided in the specification at pages 1 and 7. The instant compounds are disclosed have adenosine A_{2a} inhibitory or modulatory activity and it is recited that the instant compounds are useful in treating several diseases, for which applicants provide no competent evidence. Reading specification it appears that instant compound is useful for treating all sorts of diseases including central nervous system diseases such as Alzheimer's disease, Huntington's disease, dementia, amylotrophic lateral sclerosis etc. for which applicants have not provided any experimental support. Moreover many if not most of central nervous system diseases such as Alzheimer's disease, ALS, multiple sclerosis etc. are very difficult to treat. For multiple sclerosis alone there is no known drug, which can successfully reverse the course of the disease,

despite the fact that there are many drugs, which can be used for "inflammatory condition".

That a single class of compounds can be used to treat all diseases and disorders stated above in general embraced in the claims is an incredible finding for which applicants have not provided supporting evidence.

Even a recent review of adenosine receptors suggest the use of these antagonists still under experimental stage and speculative in nature. See Baraldi et al., European Journal of Medicinal Chemistry 38: 367-382, 2003.

Note substantiation of utility and its scope is required when utility is "speculative", "sufficiently unusual" or not provided. See Ex parte Jovanovics, 211 USPQ 907, 909; In re Langer 183 USPQ 288. Also note Hoffman v. Klaus 9 USPQ 2d 1657 and Ex parte Powers 220 USPQ 925 regarding type of testing needed to support in vivo uses.

Next, applicant's attention is drawn to the Revised Utility and Written Description Guidelines, at 66 FR 1092-1099, 2001 wherein it is emphasized that 'a claimed invention must have a specific and substantial utility'. The state of the art is indicative of the requirement for undue experimentation.

In evaluating the enablement question, several factors are to be considered. Note In re Wands, 8 USPQ2d 1400 and Ex parte Forman, 230 USPQ 546. The factors include: 1) The nature of the invention, 2) the state of the prior art, 3) the predictability or lack thereof in the art, 4) the amount of direction or guidance present, 5) the presence or absence of working examples, 6) the breadth of the claims, and 7) the quantity of experimentation needed.

1) The nature of the invention: Therapeutic use of the compounds in treating various central nervous diseases that require Adenosine A_{2a} inhibitory or modulatory activity.

2) The state of the prior art: A very recent publication expressed that the effects of Adenosine A_{2a} inhibitory activity are still in experimental stage and are unpredictable. See Baraldi et al. cited above.

3) The predictability or lack thereof in the art: Applicants have not provided any competent evidence or disclosed tests that are highly predictive for the pharmaceutical use for the treatment of all diseases and disorders stated above by the instant compounds. Pharmacological activity in general is a very unpredictable area. Note that in cases involving physiological activity such as the instant case, "the scope of enablement obviously varies inversely with the degree of unpredictability of the factors involved". See In re Fisher, 427 F.2d 833, 839, 166 USPQ 18, 24 (CCPA 1970).

4) The amount of direction or guidance present and 5) the presence or absence of working examples: Specification has no working examples to show all diseases or disorders stated above can be treated based on the test results of Adenosine A_{2a} inhibitory activity and the state of the art is that the effects of adenosine receptor antagonists are unpredictable.

6) The breadth of the claims: The instant claims as recited embrace treatment of various diseases and disorders.

7) The quantity of experimentation needed would be an undue burden to one skilled in the pharmaceutical arts since there is inadequate guidance given to the skilled artisan, regarding the pharmaceutical use, for the reasons stated above.

Thus, factors such as "sufficient working examples", "the level of skill in the art" and "predictability", etc. have been demonstrated to be sufficiently lacking in the instant case for the instant method claims. In view of the breadth of the claims, the chemical nature of the invention, the unpredictability of ligand-receptor interactions in general, and the lack of working examples regarding the activity of the claimed compounds towards treating the variety of diseases of the instant claims, one having ordinary skill in the art would have to undergo an undue amount of experimentation to use the instantly claimed invention commensurate in scope with the claims.

MPEP 2164.01(a) states, "A conclusion of lack of enablement means that, based on the evidence regarding each of the above factors, the specification, at the time the application was filed, would not have taught one skilled in the art how to make and/or use the full scope of the claimed invention without undue experimentation. In re Wright, 999 F.2d 1557,1562, 27 USPQ2d 1510, 1513 (Fed. Cir. 1993)." That conclusion is clearly justified here. Thus, undue experimentation will be required to make Applicants' invention.

This rejection is same as made in the previous office action but limited to currently pending method of use claims 34 and 36-39. Applicants' traversal to over come this rejection is not persuasive.

First of all, as noted above, instant claim 34, as recited, is a reach through claim. A reach through claim is a claim drawn to a mechanistic, receptor binding or enzymatic functionality in general format and thereby reach through a scope of invention for which they lack adequate written description and enabling disclosure in the specification.

In the instant case, based on the inhibition or modulation of adenosine-A_{2a} receptor activity by the instant compounds, instant claim reaches through treating Parkinson's disease, progressive supranuclear palsy, multiple system atrophy, Alzheimer's disease, depression, AIDS encephalopathy, multiple sclerosis, amyotrophic lateral sclerosis, migraine, attention deficit disorder, narcolepsy, sleep apnea that results in excessive daytime sleepiness, Huntington's disease, cerebral ischemia, brain trauma, hepatic fibrosis, cirrhosis, and fatty liver and thereby they lack adequate written description and enabling disclosure in the specification.

More specifically, in the instant case, based on the mode of action of instant compounds as inhibitors of modulator of adenosine-A_{2a} receptor activity, based on limited assays, it is claimed that treating various diseases and disorders stated above for which there is no enabling disclosure. It is not the breadth the claim it is the scope of enablement that is being addressed.

In the present case, specification has no objective enablement for any or all diseases mediated by adenosine-A_{2a} receptors activity in general. Contrary to applicants urging, with the genus of compounds and large list of diseases, one trained in the art had to extensively undue experimentation.

Again, it is not the objective enablement of genus of compounds is being addressed in the rejection. It is the scope of enablement for any or all diseases or disorders embraced in the claim language.

As for the traversal, again, applicants have not provided any direct evidence that the based on the mode of action of instant compounds, any or all indication can be

treated including various diseases cited above. Again, specification recites the mode of action of the instant compounds as inhibitors or modulator of adenosine-A_{2a} receptor activity but there is no direct evidence presented to show any or all diseases cited above can be treated because of the stated mode of action.

Applicants appears to assert that treating any or all diseases/disorders stated above with inhibitor or modulator of adenosine-A_{2a} receptors activity is known in the art but have not provided such a reference teaching treating any or all diseases stated above with adenosine-A_{2a} receptors inhibitors. Since, search in the related art did not suggest such an assertion, applicants should provide the literature showing treating any or all diseases/disorders by inhibitors or modulators of adenosine-A_{2a} receptors activity.

Contrary to applicants' urging, given the large genus and large genus of diseases and disorders embraced in the claim language, one trained in the art need to unduly extensive experimentation without and then he need to assign the finding as applicants' invention for want of any guidance in the specification.

Applicants have not demonstrated nor have they alleged there is any correlation between the in vitro assays they disclosed in specification and efficacy against all diseases and disorders claimed. In an unpredictable art, in vitro assays may be used for enablement only if there is a well-established correlation between the assay and clinical efficacy. Several case laws lend support to the notion that merely establishing the mode of action of a class of compounds does not provide for scope of objective enablement for any or all diseases.

The issue in Ex parte Balzarini 21 USPQ2d 1892 concerned HIV treatment and the Board of Patent Appeals and Interferences wrote "While the in vitro testing performed on these anti-viral compounds appears to be useful as a screening tool in order to determine which of these anti-viral compounds are candidates for further testing to determine if they possess in vivo utility, the in vitro tests were not predictive of in vivo efficacy."

The issue in Fujikawa v. Wattanasin 39 USPQ2d 1895 was adequacy of in vitro testing of inhibitors of cholesterol biosynthesis and U.S. Court of Appeals Federal Circuit wrote, "in vitro results, in combination with a known correlation between such in vitro results and in vivo activity, may be sufficient to establish practical utility". Such a correlation is not shown in the instant case.

In a peripheral issue involving assaying insulin-like growth factor-I ("IGF- I") in Genentech Inc. v. Chiron Corp. 55 USPQ2d 1636, U.S. Court of Appeals Federal Circuit wrote "by the critical date, ... [s]pecific binding in an RRA was known by those skilled in the art to be reasonably correlated with the in vivo biological activity of IGF-I."

In Ex parte Bhide 42 USPQ2d 1441, the Board of Patent Appeals and Interferences wrote "While in vitro or in vivo tests would not be the only possible way to overcome our basis for questioning applicants' utility, in vitro or in vivo tests certainly would provide relevant evidence". The issue in the present case is not the utility of applicants' compounds, which was at issue in Ex parte Bhide 42 USPQ2d 1441, but rather the narrower issue of enablement for claims drawn to the treatment of all

cancers. Since such a claim is inherently not credible, the standard of proof required for such an assertion must be high.

In a case concerning a DNA sequence encoding a mature human IL-3 protein, Ex parte Anderson 30 USPQ2d 1866, the Board of Patent Appeals and Interferences wrote in passing "We question whether one skilled in the art would accept appellants' in vitro test as predictive of in vivo results and whether one skilled in the art would know how to use the Pro (8) protein made .... Should the claims of this application be prosecuted further in a continuing application we urge the examiner to consider the enablement and utility aspects of patentabilityi" In an anti-tumor application, Ex parte Agarwal 23 USPQ2d 1334, the Board of Patent Appeals and Interferences wrote "there is considerable doubt that those skilled in the art would be willing to accept appellants' in vitro tests and in vivo tests as established models predictive of utility against tumors in humans. See In re Jolles, 628 F.2d 1322, 206 USPQ 885 The examiner had more than adequate reason to doubt the objective truth of the broad statement of utility set forth in appellants' specification." In the most definitive finding on this issue of the adequacy of in vitro assays for clinical claims, Ex parte Stevens 16 USPQ2d 1379 the Board of Patent Appeals and Interferences wrote "The examiner's position is based on the supposition that the facts described above evidence a prima facie case of nonenablement with regard to the disclosed utility in light of all the applicable legal precedents. Where as here, the disclosed utility is the treatment of cancer, we agree with this supposition. The examiner has cited Ex parte Busse, 1 USPQ2d 1908. In that case, the Board of Patent Appeals and Interferences reviewed the relevant prior

decisions of its reviewing court. We shall not repeat those citations here. Suffice it to say that in every cited case the narrow issue involved was whether or not the evidence of record was based on in vivo or in vitro studies which were generally recognized by those of ordinary skill in the art as being reasonably predictive of success in the practical utility under consideration, i.e., human or, at least, mammalian therapy."

In a vaccine case, Ex parte Maas 14 USPQ2d 1762, the Board of Patent Appeals and Interferences wrote "First, although appellants' specification describes certain in vitro experiments, there is no correlation on this record between in vitro experiments and a practical utility in currently available form for humans or animals. It is not enough to rely on in vitro studies where, as here, a person having ordinary skill in the art has no basis for perceiving those studies as constituting recognized screening procedures with clear relevance to utility in humans or animals. The burden is on appellants to establish the significance of the in vitro experiments set forth in their specification."

Further, the state of the art is not indicative of the fact that treatment of all types of diseases stated above by inhibition or modulation of adenosine-A_{2a} receptors activity is conventional or well known. Moreover, the findings and conclusions in the cited publications with respect to inhibition or modulation of adenosine-A_{2a} receptors activity and the application of such activity for specific types of diseases do not lend support for treating all diseases. The instant claims, on the other hand, are drawn to several types of diseases affecting different organs and having different methods of growth or harm to the body, and different vulnerabilities.

Moreover, the specification does not enable any physician skilled in the art of medicine, to use the compound of the invention commensurate in scope with the claims. The specification does not describe administration procedures and ranges of dosage regimen. The method of administration and/or the dose levels depend on a number of factors, which have to be evaluated by one of ordinary skill in the art. These factors include a) determining which of the claimed compounds would treat any particular claimed disease; b) synthesize the compound; c) formulate into a suitable dosage form depending the type of administration method; and d) conduct clinical trials or test the compound in an assay known to be correlated to clinical efficacy of such treatment. The specification pages 54-57 provide assays to determine the activity of the compounds and nothing more. Applicants have not asserted that it is art recognized that the assays are correlated to clinical efficacy for treatment of all indication by inhibition or modulation of adenosine-A_{2a} receptor activity. There is no working example of treatment of any disease in man or animal. The state of the clinical arts in does not provide any agent which effective against all indication in general or those indication mediated by said mode of action. Where the utility is unusual or difficult to treat or speculative, the examiner has authority to require evidence that tests relied on are reasonably predictive of in vivo efficacy by those skilled in the art. See for example In re Ruskin 148 USPQ 221; Exparte Jovanovics 211 USPQ 907.

Based on the fact situation of the instant application, In re Buting, 163 USPQ 689 (CCPA 1969) (cited in the previous office actions) is on point and more applicable to the instant claims wherein 'evidence involving a single compound and two types of cancer,

was held insufficient to establish the utility of the claims directed to disparate types of cancers. The judges in that case indicated that "We are not aware of any reputable authority which would accept appellant's two clinical cases as establishing utility for treatment of cancer in humans. As was pointed out in Brenner v. Manson, 148 USPQ 689, a process to be patentable must produce a useful result and be of substantial utility not merely of scientific interest or for further testing. In this case further testing seems necessary".

In summary, applicants have not provided any evidence of record that the instantly claimed compounds can effectively be used in the treatment of all diseases or disorders embraced in claims 34 and 36-39 and therefore, it is maintained that one having ordinary skill in the art would have to undergo an undue amount of experimentation to use the invention commensurate in scope with the claims.

Hence, this rejection is proper and is maintained.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to

be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-3, 9-12, 14-20, 26, 27, 34-39 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims of U.S. Patent No. 7,285,550. Although the conflicting claims are not identical, they are not patentably distinct from each other because the compound of formula I, composition and the method of use embraced in the instant claims includes the compound of formula I, composition and method of use claimed in the claims 1-36 of US 7,285,550. Note when in fifth choice of L, p1=p2=0, then the compounds claimed in the instant claims are also claimed in the claims 1-36 of US 7,285,550. Thus, it would be obvious to one trained in the art to make the genus of compounds claimed in US 7,285,550 including instant subgenus of compounds wherein L is the fifth choice with p1=p2=0 and expect these compounds to have the use taught therein.

Allowable Subject Matter

Claims 23-25 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Said claims, barring finding of any prior art in a subsequent search, would be allowable as prior art search in the related area and prior art of record did not teach or suggest the compounds embraced in these claims.

Conclusion

Any inquiry concerning this communication from the examiner should be addressed to Venkataraman Balasubramanian (Bala) whose telephone number is (571) 272-0662. The examiner can normally be reached on Monday through Thursday from 8.00 AM to 6.00 PM. The Supervisory Patent Examiner (SPE) of the art unit 1624 is James O. Wilson, whose telephone number is 571-272-0661. The fax phone number for the organization where this application or proceeding is assigned (571) 273-8300. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-1600.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAG. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-2 17-9197 (toll-free).

/Venkataraman Balasubramanian/

Primary Examiner, Art Unit 1624